

**DESIGN COMPONENTS OF A MODERN EMERGENCY OPERATIONS CENTER
(EOC) FOR THE CITY OF CLEARWATER, FLORIDA**

**EXECUTIVE ANALYSIS OF FIRE SERVICE OPERATIONS IN EMERGENCY
MANAGEMENT (EAFSOEM)**

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ABSTRACT

The City of Clearwater, Florida has an Emergency Operations Center (EOC) located in a building that has recently been declared as structurally unsafe if wind speeds exceed 100 mph. With hurricane force winds typically exceeding this benchmark, the City needed to design and construct a modern EOC in an alternate facility. The problem faced by City officials was the lack of current information available to assist the design team in the planning process for constructing a new EOC facility. The purpose of this project was to research the requirements and needs associated with an EOC and gain a current knowledge base of technology being utilized by other similar facilities. The research questions that were developed to accomplish this project were:

1. What requirements are mandated at the Federal, State and local level for the effective design of an Emergency Operations Center?
2. What modern technology and/or equipment is recommended by industry standards and experts that should be included in the design phase?
3. Who are the primary users of the Emergency Operations Center?
4. What technology and physical requirements are necessary for each primary user?

This project used an evaluative research methodology to develop a comprehensive list of components and recommendations that were useful in the design and construction of a modern EOC facility. Federal, State and local mandates were reviewed from existing reference sources and a user group was identified. Although an

extensive literary search was conducted, the material was outdated which forced the project results to rely on personal interviews from subject matter experts and site visitations to modern facilities.

The results of the evaluation found that the City of Clearwater was not required to operate an Emergency Operations Center (EOC) and should they desire to build a facility for that purpose, no Federal, State or local statutes applied (outside of normal building codes). Experts recommended careful attention to detail in the planning process with suggestions concerning environmental needs, space limitations, security issues, back-up power, telecommunications, supplies and other valuable information. The primary user group was surveyed for their input and the recommendation list was developed in the form of an appendix.

Recommendations included forming a design committee comprised of a cross-section of the user groups (both fire training and Emergency Management functions). Included in the selection of members were a State EOC and a Pinellas County EOC representative to ensure interoperability and support. Additional recommendations included having the committee review this report and visit several EOC facilities and review the appendices in the report before meeting with design experts. Future readers are encouraged to do their own research when designing an EOC facility since many experts referred to a Federal document, concerning requirements and recommendations, under development as of the writing of this paper. The State of process of building EOC facilities.

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INTRODUCTION

Managing the daily operations of a governmental entity can be both exciting and rewarding, but when a major disaster or emergency occurs, the course of actions that are needed to mitigate the disaster and minimize the effects to the community often challenge the community and its leadership. When emergencies do occur, key officials need to gather information, make decisions and take the actions deemed necessary to mitigate the incident that will protect their people, property and way of life. Such coordination is best obtained in a central facility where these officials can come together with staff support and share information vital to the decision-making process.

A central facility that is used by government officials for coordinating the response and recovery efforts needed during any type of natural or man-made disaster must be planned and prepared for in advance of a critical incident. The facility must have the physical resources required to support the government officials as they gather information and direct a wide range of possible activities. This type of facility is commonly referred to as an Emergency Operations Center (FEMA, 1984, introduction)

The problem that the City of Clearwater currently faces is that the Emergency Operations Center (EOC) is located in a building that has been declared structurally unsafe if wind speed exceeds 100 mph. With hurricane force winds typically exceeding this benchmark, the City of Clearwater needs to design and construct a modern EOC in an alternate facility to be adequately prepared for natural and man-made disasters.

The City of Clearwater has no current information available to assist the design team in the development process. The purpose of this report is to provide the City of Clearwater the necessary information that identifies the common elements utilized in the design process of a modern Emergency Operations Center and identify any additional information that may be useful in the planning process. This project will primarily utilize an evaluative research methodology to develop a comprehensive list of components and space recommendations that will be useful for design and construction of a modern EOC. Federal, State and local mandates will be reviewed from existing reference sources and a user group will be identified. The results will be provided to design team experts to incorporate into a new project that has been funded through the City's Capital Improvement Program (CIP) and is pending this recommendation. The following questions were identified and researched within this project:

1. What requirements are mandated at the Federal, State and local level for the effective design of an Emergency Operations Center?
2. What modern technology and/or equipment is recommended by industry standards and experts that should be included in the design phase?
3. Who are the primary users of the Emergency Operations Center?
4. What technology and physical requirements are necessary for each primary user?

BACKGROUND AND SIGNIFICANCE

The current Emergency Operations Center (EOC) for the City of Clearwater, Florida is located at 645 Pierce Street on the second floor of the Police Administration building. The building was constructed in May 1997. Originally designed to withstand hurricane force winds of 150 miles per hour or less, the City of Clearwater experienced a budget shortfall during the construction phase which resulted in the utilization of lesser grade building materials to bring the project in under budget projections. According to Mike Quillen, Director of Engineering for the City of Clearwater, the modifications to the original design significantly decreased the physical loading of the structure to the point where the building should be evacuated if wind shear is expected in excess of 100 miles per hour. When asked if a formal engineering study had been performed, Quillen indicated that the 100mph limitation had been cited by the engineer and the architect at the time of construction and a written "document" did not exist. He believed the threshold to be accurate and did not see the expense of such a study to be warranted if a new building project could serve as an EOC (M. Quillen, personal communication, August 12, 2003). Assistant City Manager, Garrison Brumback stated that the current facility was clearly inferior for the purpose of housing an EOC but budget restraints dictated maintaining status quo for the next few years unless other options could be identified (G. Brumback, personal communication, June 17, 2003).

During the month of May 2003, the fire department was presented an opportunity to purchase an existing facility for an apparatus maintenance operation instead of

constructing the planned CIP funded facility saving approximately \$1.3 million. This amount, coupled with a dedicated sum of \$600,000 already budgeted for an addition to the Fire training center building, will allow a new facility to be constructed that could serve a dual purpose of classroom and office space for the fire department and Emergency Operations Center when activated.

The design process for the new fire training center (and EOC) is pending this report to capture all the pertinent information necessary to create a workable space the can serve both functions well within the new cost of the project. City management is pleased that such a project can serve several critical needs when tied together and encouraged any available grant opportunities to be evaluated to ensure project completion (B. Brumback , personal communication, July 01, 2003).

City of Clearwater

Originally an agricultural and fishing village, the City of Clearwater, Florida, has grown rapidly both as a tourist destination and as a business center. Clearwater is located on the central west coast of Florida and is one of the largest cities in the rapidly-expanding Tampa Bay area. It is the county seat of Pinellas County, widely regarded as one of the Southeast's most industrialized counties, focusing on clean, light industry in a semi-tropical environment. On May 27, 1915, the City of Clearwater was incorporated. The City has a commission/city manager form of government (Herald, 2001).

Clearwater Fire and Rescue

The Clearwater Fire and Rescue Department was founded in 1911. The Department responds to approximately 21,500 calls per year and provides fire protection, fire prevention, emergency medical rescue, emergency management and public education services. The assigned fire protection district is about 42.5 square miles in area and serves a permanent population of 109,000, as well as a seasonal population increase of approximately 35,000. The Department has seven stations strategically located to provide three-to-five minute responses to incidents. The total staff under the Fire Chief's supervision is 202 and includes a fiscal year 2003/2004 budget of approximately 17.7 million dollars (City of Clearwater, Office of Management and Budget, 2003, p.118).

This research brief was completed in accordance with the applied research guidelines of the National Fire Academy's Executive Fire Officer Program. The issue addressed by the research relates specifically to Unit 9 of the *Executive Analysis of Fire Service Operations in Emergency Management* course, titled "Emergency Operations Center." This unit stressed the importance of the function of the physical Emergency Operations Center during a crisis or disaster and listed many of the features that are recommended for effective operations (Executive Analysis of Fire Service Operations in Emergency Management Student Manual, 2003, SM 9-4 to 9-10). The significance to the National Fire Academy and the United States Fire Administration is that the results of this project and the subsequent construction of a practical building for use as an EOC will satisfy several of the USFA operational objectives. Specifically, the City of

Clearwater will have a comprehensive multi-hazard risk reduction plan led by the local fire service in a facility that is appropriately constructed for this purpose and will be able to respond appropriately to emergent issues arising during man-made and natural disasters. (United States Fire Administration, Operational objectives, 2004 catalog)

LITERATURE REVIEW

The critical findings that added to this project came from five sources. The most significant contributions came from personal interviews from professionals in the emergency management field and local city management officials. In addition to the interviews, extensive library-based research was performed, professional surveys distributed, site visitations conducted and finally computer internet sources were canvassed in order to gain a broader perspective of the subject matter.

The first source of review was focused on using personal interviews with subject matter experts in order to gain a deep understanding of the details associated with designing a functional and modern Emergency Operations Center. The local Director of Emergency Management, Gary Vickers, provided a tour of the Pinellas County, Florida EOC and discussed many recommendations that he would make in relationship to the functional equipment and physical layout of his facility (G. Vickers, personal communication, July 16, 2003). He also referenced the Federal Emergency Management Agency publications entitled "EOC REQUIREMENTS AT STATE AND

LOCAL LEVELS" (August 1980) and "EMERGENCY OPERATING CENTERS HANDBOOK" (May 1984) for additional guidance. Vickers did comment that both texts were the industry standard for design of EOC's but the information contained within "was extremely dated so use it only as additional and useful information". Vickers also added that currently there are no federal or state mandates addressing the design components, however, should the City of Clearwater be interested in applying for federal assistance in the form of grants, that guidance from two publications were needed in order to qualify for funding. The publications cited were: title 44 of the Code of Federal Regulations: CPG 1-3 Federal Assistance Handbook, Emergency management, Direction and Control Programs, and CPG 1-32, Financial Assistance Guidelines, for criteria and guidance. These sources, when reviewed, provided some guidance, but specific technology recommendations were dated and not particularly useful to the design process (computer technology had not been developed during the early 1980's to a point where they were considered viable communication tools as they are today). The government publications were valuable in listing actual supply needs that should be considered as essential provisions for extended operations (FEMA, EOC Handbook, 1984, p.I-3)

A separate and equally valuable interview with Danny Kilcollins and Jon Erwin representing the State of Florida's Division of Emergency Management was beneficial in the context that they also supported Mr. Vickers recommendations to use the federal publications as only a guide and not a template for design. They provided a tour of the State of Florida's facility in Tallahassee to demonstrate the recent design features and

made many recommendations to assist in the design process. Appendix A is an information sheet describing the physical components of their facility. It is also worth mentioning that they are receiving similar requests for assistance and guidance from other jurisdictions within the State and are in process of developing a "how-to" book to accomplish exactly what this research project is addressing but stated it would realistically be 12-15 months from publication (D. Kilcollins, personal interview, July 28, 2003). Also worth noting is that an overview site map was provided showing the physical design layout of the State's EOC but the request was made to not include it within this report in the best interest of security (J. Erwin, personal communication, July 28, 2003).

An interview with Jimmy Harless, electronics engineer employed by National Fire Academy, proved valuable in the context of recognizing the need for additional equipment. Mr. Harless designed the Emergency Management simulator at the NFA/EMI training facility located in Emmitsburg, Maryland (building "S") and assists in the technical delivery of the program during training sessions. He stated, "Plan on having five times the electrical outlets and telephone lines than you think you need" (J. Harless, personal communication, February 27, 2003). Mr. Harless also offered his expertise and assistance to local architects during the design process if needed. Other personal interviews with City Officials produced information containing historical background and objectives they desired to be accomplished within the scope of the project.

The Learning Resource Center was accessed while on campus with marginal benefits to this project. Trade journal provided a few recent articles on the subject matter, but Federal and State publications were found to be quite dated (1985 was the most recent Federal source). The best information from this literature source was an article published in 1997 by Patrick Monaghan that listed seven components in EOC design that were critical to operations (Designing a Municipal Emergency Operations Centre, Emergency Preparedness Digest, December 1997).

To solicit the physical needs of the primary users of the current City of Clearwater EOC, a survey was developed and distributed to the 30 department directors and their assistants at the quarterly Emergency Management Coordinating Committee (EMCC) on June 17, 2003. This survey was intended to capture the physical and logistical needs of the primary user group and is represented by Appendix-B. Some surprising elements were discovered through this survey, most notably, the need for a lockable safe to store money in prior to a major disaster. Finance Director Margie Simmons requested this be placed within the design components so that she could store the \$2,000,000 she is required to have on hand in the event of a catastrophic storm or disaster (M. Simmons, personal communication, June 17, 2003).

Site visitations were very useful, as previously mentioned, because they afforded a "hands-on" view of the components that were considered functional by the managing staff. The "S" Building at the Fire Academy in Emmitsburg was constructed in 2002 and has many adaptive features (Harless, 2003). The State of Florida's EOC facility was

opened in 1996 and also provides the very latest in technology. A visit to the Pinellas County Emergency Operations Center provided some detail that had not been included in the previous facility tours.

The internet was not useful within the context of providing information to develop this report. With keyword searches under "Emergency and Design", "Emergency Operation Center", "EOC and Design" and other similar phrasing, many sites offered consultant services and disaster recovery services, but little information was discovered concerning actual building design features and recommendations.

The absence of current Federal and State guidelines addressing the recommendations for designing facilities used for EOC's is worth noting. Particularly in relationship to the recent developments of domestic security, terrorism and the creation of a new Department of Homeland Security, these information resources should be more current than 20 years old, but 1984 is the most current available source. This report and the recommendations listed herein relied very heavily on the input of local and State officials that serve in the Emergency Management field and perform these functions daily.

PROCEDURES

The primary focus and goal of this research project is to capture all of the needed data that could benefit planners in designing a modern facility that can function as an

Emergency Operations Center. The objectives of this research was, in fact, two-fold. The first objective was to access all written documents and publications that could provide guidance through the form of laws, statutes, requirements or recommendations. This was accomplished through literature review and interviews of public officials. The second objective was to capture the needs of the primary user group so that the facility would be functional to those who actually use it. The purpose of using an evaluative research methodology is to conduct a step-by-step analysis of all the information available, then analyze and evaluate the results effectively in order to develop recommendations that will be implemented within the design process to ensure a functional and effective building design.

Literature Review

Preparing this research brief began with an extensive literature review at the Learning Resource Center at the National Emergency Training Center in February 2003. Additional literature reviews were conducted at the City of Clearwater Public Library in Clearwater, Florida, and within texts and documents available within City of Clearwater Fire Administration Headquarters and were completed by August 2003. The review of available literature from these sources included books, government publications, journals, newspapers, and available applied research projects. The author also conducted a search for available information on the Internet over a period of time during the months of June and July 2003.

Personal Interviews

The interviews were conducted over a five-month time period. The interview subjects were divided into two categories. The first group interviewed were subject matter experts that were chosen by the author. The second group interviewed were defined as the primary and secondary user group (or those who would physically use the new Emergency Operations Center). The first interview took place at the Fire Academy in February 2003 within the context of the EAFSOEMs course with Fire Academy experts Jimmy Harless and Philip McLaughlin. Mr. Harless is an Electronics Engineer that designed the current facility used by the National Fire Academy (NFA) and the Emergency Management Institute (EMI) for emergency operations training. Mr. McLaughlin is a retired deputy Fire Commissioner for the City of Philadelphia and is considered one of the leading experts in the field of Emergency Operations. Mr. McLaughlin also works as a consultant in the design phase of Emergency Operations Centers and has assisted in the construction of many EOC's across the nation (C. Burkell, personal communication, March 05, 2003). Other subject matter experts included: Gary Vickers, Director of Emergency management in Pinellas County, Florida; Danny Kilcollins and Jon Erwin (both) representing the State of Florida Department of Emergency Management.

Each of the subject matter experts were provided a background of what the City of Clearwater was intending to build and ask for their input and assistance. Specifically, the following questions were presented to each:

1. What are the Federal requirements regulating the design of EOC's?
2. What basic standards need to be met to ensure functional ability?
3. What technology components would you recommend?
4. What components do most designers overlook that the City should consider?
5. If you were performing this research, what reference sources and people would you talk to in order to avoid missing any critical piece of information?

The second group interviewed included most of the primary user group, including the City Manager, Fire Chief, Police Chief and other department directors. They provided background and historical significance and offered suggestions concerning interoperability and functionality. There were no structured questions provided to all of the user group other than:

1. What can you tell me about the history of the City of Clearwater's EOC?
2. What components do you see as vital to sustained operations?

From this point, each conversation deviated to a path focusing on their specific physical needs. To encompass all the primary and secondary user group participants, a survey was developed and distributed and can be found in Appendix B.

Survey Instrument

A survey was developed to collect information from all of the primary and secondary user group participants. A primary user was defined as an employee who was mandated by the Basic Emergency Plan to participate in all EOC activations (Basic Emergency Plan, City of Clearwater, 1994, p.2). This primary user would normally be a department director. A secondary user is defined as additional support staff that would be called to assist in the EOC when deemed necessary by the Emergency Manager (normally an assistant department head or division supervisor).

The survey consisted of a one-page short answer questionnaire intended to solicit critical logistical information. The blank form provided to the user group is represented in Appendix B. Thirty surveys were distributed at the quarterly Emergency Management Coordinating Committee (EMCC) meeting held on June 17, 2003. Of the 30 surveys distributed, 27 were returned within the 10-day time requirement as requested. No surveys were returned after the deadline.

Assumptions

The assumptions used to gather information and determine results are based on the following:

- The literature review was thorough and includes recent and applicable information.
- The experience and credentials of the fire service professionals consulted and interviewed are undeniable.

- The survey was written to elicit objective responses and limit, (but not eliminate) any subjective influences.
- The conclusions of the author are logical and reasonable.

Limitations

Limitations in the research are the result of the necessity to closely define the subject matter, given the limited time constraint of six months. It should be emphasized that the author's interviews with subject matter experts took place within a limited scheduled time frame but experienced frequent interruptions due to daily operations.

The accuracy of survey results is also a limiting factor. Although the surveys were sent to the attention of primary user group, many secondary users filled them out and returned them for their supervisors.

Definition of Terms

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| 1. National Fire Academy (NFA) | National educational facility located in Emmitsburg, Maryland in conjunction with the Emergency Management Institute (EMI) that focuses on the educational and training needs of those in the Fire service and performing Emergency Management duties. |
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|--------------------------------------|---|
| 2. FEMA | Federal Emergency Management Agency |
| 3. Learning Resource Center (LRC) | Library and Archive for fire service-related reference material located on the main campus of the NFA |
| 4. Emergency Operations Center (EOC) | Central facility used for the coordination and direction of government activities during an emergency. |
| 5. Capital Improvement Program (CIP) | Facility or project needing more than \$50,000 of funding. Threshold amount varies between communities. |
| 6. EMCC | Emergency Management Coordinating Committee |
| 7. BEP | Basic Emergency Plan |

RESULTS

1. What requirements are mandated at the Federal, State and local level for the effective design of an Emergency Operations Center?

As the conceptual phase began in this project, one of the very first questions that arose for city officials was: When we actually begin building a new EOC, what are we mandated to do? The answer to the question is: there are no mandates. The Federal guidelines published in 1980 and again in 1984 provide some excellent recommendations of space allocation and supplies needed, but in researching specific mandates, the design features of an EOC are left to the political subdivision funding the project (Kilcollins, 2003). It is worth noting that any jurisdiction desiring supplemental funding for an EOC facility, must follow FEMA regulations listed in Title 44 of the Code of Federal Regulations: CPG 1-3 Federal Assistance Handbook, Emergency Management, Direction and Control Programs (Vickers, 2003). If a jurisdiction desires no financial assistance, then federal guidelines and handbook are only supplemental information sources. If a jurisdiction does seek assistance, then the above quoted reference source then becomes a "mandate" in order to qualify for assistance.

In researching the statutory regulations of who must have a facility that is designated as an EOC, it was found that Florida Law directs the Counties to have an Emergency Manager (Title XVII- 252.38 Section 1b), and maintain and Emergency Operations Center (Title XVII- 252.38 Section 3a3). This specific section also allows municipalities to perform emergency management functions and operate an EOC, but

only in coordination with, and under the authority of the Counties (Title XVII-252.38 Section 2).

The City of Clearwater can operate and build an EOC but is not required to do so under any Federal, State or local law. If the City desires to build an EOC, the only mandate is that the activities be coordinated with Pinellas County. No specific governmental mandates are imposed in reference to the actual design unless the City is seeking supplemental funding for the project. According to Gary Vickers, the closer the building is designed to comply with all the Federal recommendations, the better the opportunity to request federal financial assistance (2003). Also worth noting is that County and State officials must approve the design and provide written support if requesting Federal funds (Erwin, 2003).

2. What modern technology and equipment is recommended by industry standards and experts that should be included in the design phase?

When analyzing the recommendations from the many local, State and Federal sources, some divisions were organized and broken into categories for purposes of understanding. These categories can then be reviewed in a systematic approach (Monaghan, 1997). The results of the cumulative recommendations from text and personal interviews are listed in Appendix C, but some of the highlights are mentioned by category below.

Sufficient Space and Accommodation

The current EOC utilized by the City of Clearwater is approximately 2800 square feet and is located on the second floor of the Police headquarters building (R. Herald, personal communication, August 11, 2003). The recommendations from multiple interviews suggests that for our size of jurisdiction (130,000 citizens), approximately 3000 square foot should suffice (Vickers, 2003). Several interviews produced formula representations that were "general guidelines", but the average was considering 100 square foot for each primary user to be appropriate (Erwin, 2003). With no more than 30 actual primary users, the recommendation of 3000 square foot appears to be accurate. This numerical representation has some value in the planning process, but when viewed in the context of co-location with a full service fire training facility, each component of the building will serve a dual purpose. The committee comprised of fire service representatives have identified a building in concept ranging between 12,000 to 14,000 square foot (P. Huffman, personal communication, June 15, 2003). According to Dan Mayer, Information Technology Director for the City of Clearwater, the only part of the EOC that will not serve a dual function is approximately 1000 square foot needed for back-up communication and computer main-frame operations (personal communication, May 07, 2003). With this development, a building in the range of 13,000-15,000 will suffice.

Self Contained and Self Sufficient

When activated, EOC's can operate around the clock for extended periods of time depending on the severity of the event itself (Monaghan, 1997). Therefore

provisions should be anticipated to include sleeping areas, food preparation, storage, dining and other support functions. The State of Florida included an 8,000 gallon potable water tank storage in case the water supply failed as well as a 10,000 gallon overflow sewage tank in case the pumping system also was rendered inoperable (Kilcollins, 2003).

Back- up Power

The State's EOC has a back-up electrical power generation supply of 350KVA with automatic transfer switches (Appendix-A). The one addition to having a back-up generator is having the need to "back-up, the back-up". According to Kilcollins, their Emergency generator is equipped with an override hook-up that allows for a mobile unit to hook-in and supply power in case the fixed generator is rendered inoperable (Kilcollins 2003). Determining the necessary capacity of needed back-up power should be left to engineers once the building capacity is calculated (R. Myers, APCO Bulletin, January, 1995)

Telecommunications

Telecommunications expert, Jimmy Harless from the National Fire Academy stated that all too often, designers underestimate communication equipment. His recommendation was: " to multiply your needs by five for both telephone and electrical outlets, and you may hit it just right!" (Harless, 2003). To add to this, communication expert John Fleming from the Florida State EOC advised to seriously consider bringing your phone lines in from different directions and having at least two different exchanges

(into the physical EOC building). He also recommended multiple telephone exchanges run through fiber optics underground in case one line becomes damaged (J. Fleming, personal interview, June 2003)

Environmental

Clearwater Fire Chief Rowland Herald stated that with Florida's climate being subtropical, the air conditioning system will be vital to extended operations within an EOC (Herald, 2003). Proximity to nuclear power plants and chemical and industrial processes may also effect design systems (Monaghan, 1997).

Security

Security becomes a significant issue when dealing with the media during major events (Erwin, 2003). Local officials also asked for higher security than the current facility employs. "Having a building that can be secured against outside sources when needed is absolutely critical" (Kilcollins, 2003). Kilcollins also mentioned that any building used as an EOC needs to be maintained in a ready state during non-emergency activity due to the possible threat of terrorism. He added a recommendation that security be carefully considered if the City of Clearwater proposed to use one building for multiple uses.

Supplies/ Resources

Gary Vickers recommends that supplies be identified well in advance and adequate storage facilities be planned for in the design phase (2003). He added that all too often, the simplest things get overlooked. As Director of the Pinellas County EOC, he finds that storage space is a premium in his facility and the sleeping quarters are much too close to where the major activity center is located.

Vickers also added that the use of Fiber optic cabling was critical to building an effective EOC for speed and dependability of communication equipment. He added that the use of satellite systems was a vital link to the State of Florida's EOC. Philip McLaughlin, Retired Deputy Commissioner of the Philadelphia Fire Department, advised that having a removable flooring system throughout an EOC's entire building was a major improvement from historical building designs and one that lends itself well to adaptability for future technology. He also recommended using CAT 5 (100) cabling and reiterated Mr. Harless' views on supplying more telephone lines and electrical outlets than normally expected (P. McLaughlin, personal interview, March 2003).

3. Who are the primary users of the EOC?

According to the City of Clearwater's Basic Emergency Plan, there are 30 designated primary users of an EOC during an emergency (City of Clearwater, Office of emergency management, 1999). They are:

- The elected officials (5) including the Mayor and (4) City Commissioners
- City Manager and (2) Assistant City Managers

- Emergency Manager
- 21 Department Directors or critical positions (including the Fire Chief, Police Chief, Public Communications, Finance, Budget, Solid Waste Director, Public works, etc.)

4. What technology and physical requirements are necessary for each primary user?

A survey was sent to all primary user group members as identified with the City's Basic Emergency Plan. This survey was distributed on June 17, 2003 at the quarterly EMCC meeting to 30 employees. The due date of June 27, 2003 produced 27 responses with no other responses coming in after the deadline. All of the respondents filled out the survey as represented in Appendix B and the information was collated and presented in Appendix C. Miscellaneous items that were identified included specialty software for finance, personnel and police activities and a safe for the Director of Finance to store the large amount of cash she is required by statute to possess (M. Simmons, follow-up personal communication, July 2003).

Personal care issues were also identified as critical to operations. More than half of the respondents identified items like showers, first-aid kits, defibrillators (in case stressful situations arise), bedding and supplies of rain gear. The accumulation of user group needs were organized, categorized and presented in Appendix C.

DISCUSSION

Before deciding to research this specific subject, this author had a discussion with Mr. Jack Fox, Information Technology Services Directorate for FEMA. As the conversation unfolded and he was made aware that the City of Clearwater was about to build a new EOC facility, he began to give advise specific personnel to reference at both the Federal level and several different States that had very modern facilities (J. Fox, personal communication, February, 2003). This author was under the impression that building an EOC facility wasn't really a new concept so finding a literature source and guidance would be simple and obtainable. As we exchanged views on the matter, he referenced sources published by FEMA that were more than 20 years old and called them "outdated at best".

Mr. Fox then stated that FEMA was currently working on a new EOC handbook that would encompass design standards but this document was only in the development phase and wouldn't be available for 12-15 months minimum. He strongly urged me to use personal interviews as the major source of information and referred me to 2 experts in attendance at the Fire Academy during the week of February 24, 2003. Mr. Jimmy Harless, an electronics engineer for NFA and Mr. Philip McLaughlin, a retired Fire service professional provided an excellent source of initial information and guidance. The most significant of which was their offer to personally work with our design team when the opportunity came for no compensation (other than expenses).

The literature on hand today through the LRC is dated, as most of the experts that were interviewed attested too. The most valuable contributions to the project were made by subject matter experts who deal with Emergency Operations on a daily basis. Vickers, McLaughlin, Kilcollins and Erwin were validated in their personal opinions that the City of Clearwater would not be subject to any Federal mandates and would not be even required to have an EOC. Florida State Statute, Title XVII- Chapter 252 outlines authority and provides guidance on responsibilities of Counties within the role of Emergency Management. Quite surprisingly, this author was under the impression that since the City of Clearwater already had a functional EOC and a Director of Emergency Management, we had some statutory requirements for maintenance and operations. This was not the case as Florida law provides authority to the County making the Cities subordinate.

The actual components that are listed in Appendix C are recommendations derived from Appendices A & B combined with the many personal interviews and the few current trade articles that have been evaluated and custom tailored for this community. Some of the recommendations were discarded since they were not applicable, like the need for several types of heating systems and insulation from the cold weather extremes (P. Monaghan, 1997).

This project started as a search for written guidance and examples of modern design features of facilities used as Emergency Operation Centers and has ended with

literally dozens of personal observations from 13 subject matter experts and user group members. The organization implications of this research to the City of Clearwater is a greater understanding of legal mandates and suggested design components that when employed, should produce a state-of-the-art modern facility.

RECOMMENDATIONS

Building a new facility is not a new venture into the unknown for most communities. Designing and constructing a facility for the intended use of acting as an Emergency Operations Center is much more specialized and will take much more thought and research within the planning process. Upon review of the information contained within the scope of this project, several recommendations come to mind prior to building a new facility. The primary recommendations are:

1. Form a committee comprised of a cross-section of the user groups (both Fire training and EM functions).
2. Include a State EOC and a Pinellas County EOC representative on the committee to ensure interoperability and support.
3. Have the committee review this report.

4. Have the committee visit several EOC facilities and review the appendices in the report before meeting with design experts.
5. Require the committee to review the Federal publications: Title 44 of the Code of Federal Regulations: CPG 1-3 Federal Assistance Handbook, Emergency Management, Direction and Control Programs, and CPG 1-32, Financial Assistance Guidelines, for criteria and guidance. Regardless of the communities desire for Federal financial assistance, these publications can assist in the planning process.
6. Upon review of all the text references used in this project, the committee should seek a design expert that has proven skills with previous EOC facilities.
7. Invite experts from the federal level to attend the design sessions with the contracted architect (specifically, Mr. Jimmy Harless and Mr. Philip McLaughlin).

These recommendations listed above are the beginning point for initiating the design and construction process for building a modern facility capable of being utilized as an Emergency Operations Center when activated. The problem identified in this project was that the City of Clearwater has no current information available to assist the design team members in the planning and develop stages of constructing a modern EOC. The purpose of this project was to appropriately research the requirements and needs associated with an EOC and gain a current knowledge base of technology being

utilized by other municipalities so that the City of Clearwater could avoid building a facility that was already outdated before it could be used.

Future readers are encouraged to do their own research when designing an EOC facility since many subject matter experts referred to a Federal document concerning requirements and recommendations under development as of the writing of this paper. The State of Florida is also preparing a similar document to assist other jurisdictions in the design process of building EOC facilities. Future readers are also encouraged to write about their experiences (good or bad) so that others may learn from their successes and mistakes. Very little information on the subject addressed by this report was found in trade journals or the LRC. This type of literary documentation would make an excellent EFO paper or trade journal story that could benefit the entire Fire Service community.

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Appendix A

STATE OF FLORIDA
EMERGENCY OPERATIONS CENTER
INFORMATION SHEET

Exterior envelope designed to withstand 200 mph hurricane wind forces:

- Standing seam metal roof 18 gauge aluminum with two ½" protection board layers on a 20 gauge structural metal deck supported by open web steel joists.
- 8" reinforced and fully grouted concrete masonry unit load bearing exterior walls with brick facing.
- Tested aluminum window system with DuPont SentryGlass protective glazing.
- Heavy-duty entry doors with three-point latching system and card reader security access.

Building interior features:

- 20,000 sq ft floor area fully ADA accessible.
- Fifteen separate Emergency Support Function rooms for acoustical isolation from main Operations Room.
- 60-foot long projection screen for ceiling mounted multi-media front projection.
- Computer access floor areas installed within slab depression to eliminate ramps.
- 24 hour Communications Room centrally located on raised floor for better oversight of 3,500 sq ft Operations Room
- Shower and food preparation facilities.

2,000 sq ft Mechanical Mezzanine:

- 125 KVA Uninterrupted Power Supply system with battery protection for 20 minutes at 100 KW load.
- Electrical and telephone systems protected by locating switchgear within building.
- Category 5 telecommunications system wiring throughout building.
- Two independent telephone trunk lines for system redundancy.

600 sq ft Emergency Generator Building:

- Exterior envelope designed to withstand 200 mph hurricane wind forces.
- 350 KVA emergency generator with automatic transfer switch and monitoring within Communications Room.
- Pre-wired for rapid connection of back-up mobile generator.

Site features include:

- 8,000-gallon flow-through domestic water storage tank.
- Sanitary sewer system with excess capacity.
- Pre-plumbed for connection of mobile chiller system for HVAC redundancy.
- Four locations pre-wired for direct video/data feed to media vans.
- Satellite dish array pre-wired to Communications Room for sending and receiving.
- Overflow parking for 60 additional cars.

Appendix-B

Emergency Operations Center Questionnaire

Department Name: _____

Your Name: _____

Definitions:

Primary User- A member of the Management Team that is required by the Basic Operational Plan to attend any expanded activation (Level III).

Alternate User- Any member of staff that may attend an activation of the EOC to serve in an "as-needed" basis.

1. Please circle your status.

Primary

Alternate

Don't Know

2. What are your specific technology needs? (circle all that apply- please add items you do not see):

Computer

Television (current news)

Radios (1-way)

T-3 connection

Computer Access

Typewriter

Radios (mobile 2-way)

Telephone

Dictaphone (Voice recorder)

Software (please specify)

Specific technology needs not mentioned above (please list)

3. What are your physical requirements? (circle all that apply- please add items you do not see):

Desk

Restrooms

Pens/Paper

Reference Material

Emergency Power Supply

Chair

Break-room

Flipcharts

"Break-Out" Rooms

Food/Water/etc.

Table

Adequate Lighting

Maps

Whiteboards

Specific needs not mentioned above (please list.....example, wheel chair access)

***** Please return to Deputy Fire Chief Welker by 6-27-03. Thanks!!!*

Appendix-C

Recommendations for Designing a Modern EOC (City of Clearwater, Florida)

Facility

- Size- 13,000-15,000 square foot total
12,000 square foot needed for use as fire training facility
2,000 square foot needed for space unique to EOC
(IT back-up, communications equipment, etc.)
- Parking- minimum 30 spaces (primary users), but will need to accommodate fire training activities and applicable building code standards.
- Building Construction- built to withstand 200mph winds (full category 5 hurricane rating). Federal publications available for guidance if federal financial assistance will be requested.
- Cost- ranging from \$135/sq.ft.(St. Petersburg EOC) to \$165/sq.ft (State of Florida)
Total cost of project at \$180/sq.ft. worst case scenario = \$2.52 Million based on estimates of (14,000 sq.ft.)
- Full ADA accessibility

Security

- Closed circuit camera system w/ recorder through out structure
- Door closures/ electronic and manual locks to prevent random access and non-authorized visitors

Infrastructure

- Back-up water system (8,000 gallon capacity for potable water)
- Sanitary sewer overflow tank (10,000 capacity in-line)
- Power generation back-up sized appropriately for building per engineering specifications. Able to power 110% of building maximum capacity and have in-line override in case of failure to accommodate mobile hook-up. (estimated at 250-300KVA)
- Pre-plumbed for connection of mobile chiller system for HVAC redundancy.
- Environmental system self contained and able to be isolated due to radiation exposure or chemical release (if located near chemical plant)
- Consider EMP protection (Electro-magnetic pulse)
- Large safe for money storage

Technology

- Category 5 wiring and cabling for telecommunications throughout building
- Fiber optic transmission lines feeding main building
- Sufficient telephone lines entering building from opposite direction from 2 separate trunked exchanges to ensure reliability and redundancy
- Satellite system with dish arranged for sending and receiving
- Public address system (cable "cut-in")
- Media broadcast/simulcast for major networks/ back-up direct cabling to parking area.
- HAM radio system for volunteer users
- 911 back-up system for both Police and County
- Satellite link for Storm Sentry program
- Cable management rack
- Battery back-up power supply (125KVA to maintain critical systems until generator overrides)
- Security pass coding for all entry thresholds with closed circuit camera monitoring.
- Full internet access from all data lines

Interior

- Size-Main EOC room for operations, doubles as classroom for fire training
- Raised carbon-based and removable flooring for future adaptation.
- Eight separate acoustical emergency support (break-out) rooms for specialized meetings adjacent to main EOC room.
- Full service kitchen and food preparation area
- Office space for full time staff (X5)
- Media room for public announcements
- Media reproduction room (VCR, DVD editing and copying)
- Large bathroom facilities
- Bunkroom area for sleeping both genders (can double as an alternate classroom)
- Locker-room/ changing area (adjacent to bunkroom and showers)
- Library for reference texts and hardbound document storage-
- Computer mainframe and back-up
- Administrative conference room
- Main display screen rear-projection. Able to access all broadcast and satellite channels. 4 ceiling hung projectors for alternate channels, PowerPoint, GIS demonstrations, weather information.
- More electrical outlet than building code requires (at least double....strategically placed)

Supplies and Equipment- storage concerns

- Satellite cellular phone
- Food storage (if catering option is not utilized)
- Assorted office furniture and equipment
- Medical equipment and defibrillator
- Copies of Basic Emergency Plan
- Functional vests with position identifiers
- Office supplies- paper, pens, light bulbs, etc.
- Desk/positional signs
- Fax and Copy machines

- ❑ 4 Televisions with VCR recorders.
- ❑ Washer/Dryer
- ❑ Towels
- ❑ CO detectors
- ❑ Exit lighting with back-up batteries
- ❑ Flashlights with spare batteries
- ❑ Large dry erase boards
- ❑ Desk top computers (for 30 primary users)
- ❑ Phones (for 30 primary users)
- ❑ Personal hygiene items (toothbrushes, shampoo, soap, deodorant, etc.)
- ❑ Hurricane tracking chart
- ❑ "PANA" scrolling message boards with fax or laser printers attached
- ❑ Status board with associated software
- ❑ Maps: topographical and demographic
- ❑ Logs and notebooks
- ❑ Shelter capability chart